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ABSTRACT

This document, which is intended for use by community and junior colleges throughout Mississippi, contains curriculum frameworks for the course sequences in the collision repair technology programs cluster. Presented in the introductory section are a description of the program and suggested course sequences for 1- and 2-year certificates. Section I lists baseline competencies, and section II consists of outlines for each of the following courses in the sequence: restraint systems and interior trim; bolted units, assemblies, and electrical systems; glass and related hardware installation and sealing; automotive body welding and cutting; refinishing I and II; sheet metal repair; body panel and upper body structural repair I; refinishing III; body panel and upper body structural repair II; frame and underbody structural repair I and II; fiberglass and plastic repair; collision analysis and estimation; shop operations and procedures; special problem in collision repair technology; and work-based learning in collision repair technology. Each course outline contains some/all of the following: course name and abbreviation; course classification; course description; prerequisites; and competencies and suggested objectives. Recommended tools and equipment are listed in section III. Appended are lists of related academic topics and workplace skills for the 21st century and student competency profiles for both courses. (KC)

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ED 397 317

Mississippi Curriculum Framework for Collision Repair Technology

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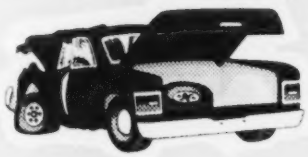

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MISSISSIPPI

CURRICULUM FRAMEWORK

FOR

COLLISION REPAIR TECHNOLOGY

(PROGRAM CIP: 47.0603 - Auto/Autobody Repair)

POSTSECONDARY PROGRAMS 1996

July 30, 1996

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FOREWORD

In order to survive in today's global economy, businesses and industries have had to adopt new practices and procedures. Total quality management, statistical process control, participatory management, and other concepts of high performance work organizations are practices by which successful companies survive. Employers now expect their employees to be able to read, write, and communicate effectively; solve problems and make decisions; and interact with the technologies that are prevalent in today's workplace. Vocational-technical education programs must also adopt these practices in order to provide graduates who can enter and advance in the changing work world.

The curriculum framework in this document reflects these changes in the workplace and a number of other factors that impact on local vocational-technical programs. Federal and state legislation calls for articulation between high school and community college programs, integration of academic and vocational skills, and the development of sequential courses of study that provide students with the optimum educational path for achieving successful employment. National skills standards, developed by industry groups and sponsored by the U. S. Departments of Education and Labor, provide vocational educators with the expectations of employers across the United States. All of these factors are reflected in the framework found in this document.

Each postsecondary program of instruction consists of a program description and a suggested sequence of courses which focus on the development of occupational competencies. Each vocational-technical course in this sequence has been written using a common format which includes the following components:

- Course Name - A common name that will be used by all community/junior colleges in reporting students.

- Course Abbreviation - A common abbreviation that will be used by all community/junior colleges in reporting students.

- Classification - Courses may be classified as:
  - Vocational-technical core - A required vocational-technical course for all students.
  - Vocational-technical elective - An elective vocational-technical course.
  - Related academic course - An academic course which provides academic skills and knowledge directly related to the program area.
  - Academic core - An academic course which is required as part of the requirements for an Associate degree.

- Description - A short narrative which includes the major purpose(s) of the course and the recommended number of hours of lecture and laboratory activities to be conducted each week during a regular semester.

- Prerequisites - A listing of any prerequisite courses that must be taken prior to or on enrollment in the course.

- Competencies and Suggested Objectives - A listing of the competencies (major concepts and performances) and of the suggested student objectives that will enable students to demonstrate mastery of these competencies.

The following guidelines were used in developing the program(s) in this document and should be considered in compiling and revising course syllabi and daily lesson plans at the local level:

- The content of the courses in this document reflects approximately 75 percent of the time allocated to each course. For example, in a four semester hour course consisting of 30 hours lecture and 120 hours of laboratory activities, approximately 22 hours of lecture and 90 hours of lab should be taken by the competencies and suggested objectives identified in the course framework. The remaining 25 percent of each course should be developed at the local district level and may reflect:
  - Additional competencies and objectives within the course related to topics not found in the State framework, including activities related to specific needs of industries in the community college district.
  - Activities which develop a higher level of mastery on the existing competencies and suggested objectives.
  - Activities and instruction related to new technologies and concepts that were not prevalent at the time the current framework was developed/revised.
  - Activities which implement components of the Mississippi Tech Prep initiative, including integration of academic and vocational-technical skills and coursework, school-to-career transition activities, and articulation of secondary and postsecondary vocational-technical programs.
  - Individualized learning activities, including worksite learning activities, to better prepare individuals in the courses for their chosen occupational area.

- Sequencing of the course within a program is left to the discretion of the local district. Naturally, foundation courses related to topics such as safety, tool and equipment usage, and other fundamental skills should be taught first. Other courses related to specific skill areas and related academics, however, may be sequenced to take advantage of seasonal and climatic conditions, resources located outside of the school, and other factors.

- Programs that offer an Associate of Applied Science degree must include a minimum 15 semester credit hour academic core. Specific courses to be taken within this core are to be determined by the local district. Minimum academic core courses are as follows:
  - 3 semester credit hours — Math/Science Elective
  - 3 semester credit hours — Written Communications Elective
  - 3 semester credit hours — Oral Communications Elective
  - 3 semester credit hours — Humanities/Fine Arts Elective
  - 3 semester credit hours — Social/Behavioral Science Elective

  It is recommended that courses in the academic core be spaced out over the entire length of the program, so that students complete some academic and vocational-technical courses each semester. Each community/junior college has the discretion to select the actual courses that are required to meet this academic core requirement.

- In instances where secondary programs are directly related to community and junior college programs, competencies and suggested objectives from the high school programs are listed as Baseline Competencies. These competencies and objectives reflect skills and knowledge that are directly related to the community and junior college vocational-technical program. In adopting the curriculum framework, each community and junior college is asked to give assurances that:
  - students who can demonstrate mastery of the Baseline Competencies do not receive duplicate instruction, and
  - students who cannot demonstrate mastery of this content will be given the opportunity to do so.

- The roles of the Baseline Competencies are to:
  - Assist community/junior college personnel in developing articulation agreements with high schools, and
  - Ensure that all community and junior college courses provide a higher level of instruction than their secondary counterparts

- The Baseline Competencies may be taught as special "Introduction" courses for 3-6 semester hours of institutional credit which will not count toward Associate degree requirements. Community and junior colleges may choose to integrate the Baseline Competencies into ongoing courses in lieu of offering the "Introduction" courses or may offer the competencies through special projects or individualized instruction methods.

- Technical elective courses have been included to allow community colleges and students to customize programs to meet the needs of industries and employers in their area.

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TABLE OF CONTENTS

Page

FOREWORD iii

ACKNOWLEDGEMENTS vii

PROGRAM DESCRIPTION 1

SUGGESTED COURSE SEQUENCE FOR
ONE-YEAR CERTIFICATE OF COLLISION REPAIR 2

SUGGESTED COURSE SEQUENCE FOR
TWO-YEAR CERTIFICATE OF COLLISION REPAIR 3

SUGGESTED COURSE SEQUENCE FOR COLLISION REPAIR TECHNOLOGY 4

SECTION I: BASELINE COMPETENCIES 7

SECTION II: CURRICULUM GUIDE FOR
COLLISION REPAIR TECHNOLOGY 19

Collision Repair Technology Courses 21
Restraint Systems and Interior Trim 23
Bolted Units, Assemblies, and Electrical Systems 25
Glass and Related Hardware Installation and Sealing 26
Automotive Body Welding and Cutting 28
Refinishing I 30
Refinishing II 32
Sheet Metal Repair 33
Body Panel and Upper Structural Repair I 34
Refinishing III 35
Body Panel and Upper Structural Repair II 36
Frame and Underbody Structural Repair I 37
Frame and Underbody Structural Repair II 38
Fiberglass and Plastic Repair 39
Collision Analysis and Estimation 40
Shop Operations and Procedures 41
Special Problem in Collision Repair Technology 42
Work-Based Learning in Collision Repair Technology 43

SECTION III: RECOMMENDED TOOLS AND EQUIPMENT 45

APPENDIX A: RELATED ACADEMIC TOPICS A-1

APPENDIX B: WORKPLACE SKILLS B-1

APPENDIX C: STUDENT COMPETENCY PROFILE C-1

COLLISION REPAIR TECHNOLOGY

PROGRAM DESCRIPTION

Collision Repair Technology is an instructional program designed to prepare students for entry level into the Collision Repair and Refinishing trade. Upon completion of this program, the students should be prepared for beginning positions as body, frame, and refinish technicians. Students will be provided theory and practical repair and refinish work beginning with basic applications and progressing on to heavy collision repairs requiring major body and frame alignment and panel replacement. The instruction includes all phases necessary to teach collision repair including glass replacement, welding, replacement of hardware and trim items, cosmetic, and structural repairs.

SUGGESTED COURSE SEQUENCE FOR ONE-YEAR CERTIFICATE OF COLLISION REPAIR*

A One-Year Certificate of Collision Repair may be awarded to a student who successfully completes the first year or 25 semester credit hours of required courses. The required courses for the certificate course include:

Baseline Competencies for Collision Repair Technology**

FIRST YEAR

3 sch	Restraining Systems and Interior Trim (ABT 1113)	3 sch	Bolted Units, Assemblies, and Electrical Systems (ABT 1123)
3 sch	Automotive Body Welding and Cutting (ABT 1213)	3 sch	Body Panel and Upper Structural Repair I (ABT 1423)
4 sch	Sheet Metal Repair (ABT 1414)	3 sch	Glass and Related Hardware Installation and Sealing (ABT 1133)
3 sch	Refinishing I (ABT 1313)	4 sch	Refinishing II (ABT 1324)
13 sch		13 sch	

* Students who lack entry level skills in math, English, science, etc., will be provided related studies.

** Baseline competencies are taken from the high school Automotive Body Repair program. Students who can document mastery of these competencies should not receive duplicate instruction. Students who cannot demonstrate mastery will be required to do so.

July 30, 1996

SUGGESTED COURSE SEQUENCE FOR TWO-YEAR CERTIFICATE OF COLLISION REPAIR*

Baseline Competencies for Collision Repair Technology**

FIRST YEAR

3 sch	Automotive Body Welding and Cutting (ABT 1213)	3 sch	Bolted Units, Assemblies, and Electrical Systems (ABT 1123)
4 sch	Sheet Metal Repair (ABT 1414)	3 sch	Body Panel and Upper Structural Repair I (ABT 1423)
3 sch	Refinishing I (ABT 1213)	3 sch	Glass and Related Hardware Installation and Sealing (ABT 1133)
3 sch	Restraint Systems and Interior Trim (ABT 1113)	4 sch	Refinishing II (ABT 1324)
13 sch		13 sch	

SECOND YEAR

3 sch	Refinishing III (ABT 2333)	4 sch	Frame and Underbody Structural Repair II (ABT 2524)
3 sch	Frame and Underbody Repair (ABT 2513)	3 sch	Collision Analysis and Estimation (ABT 2713)
4 sch	Body Panel and Upper Structure Repair II (ABT 2434)	3 sch	Vocational-Technical Elective†
3 sch	Fiberglass and Plastic Repair (ABT 2613)	3 sch	Vocational-Technical Elective†
13 sch		13 sch	

* Students who lack entry level skills in math, English, science, etc., will be provided related studies.

** Baseline competencies are taken from the high school Automotive Body Repair program. Students who can document mastery of these competencies should not receive duplicate instruction. Students who cannot demonstrate mastery will be required to do so.

† Approved Electives:
Shop Operations and Procedures (ABT 2813)
Special Problem in Collision Repair Technology (ABT 291[1-3])
Work-Based Learning in Collision Repair Technology (ABT 292[1-6])

COLLISION REPAIR TECHNOLOGY

SUGGESTED COURSE SEQUENCE*

Baseline Competencies for Collision Repair Technology**

FIRST YEAR

3 sch	Restraint Systems and Interior Trim (ABT 1113)	3 sch	Bolted Units, Assemblies, and Electrical Systems (ABT 1123)
3 sch	Automotive Body Welding and Cutting (ABT 1213)	3 sch	Body Panel and Upper Structural Repair I (ABT 1423)
4 sch	Sheet Metal Repair (ABT 1414)	3 sch	Glass and Related Hardware Installation and Sealing (ABT 1133)
3 sch	Refinishing I (ABT 1313)	4 sch	Refinishing II (ABT 1324)
3 sch	Written Communications Elective	3 sch	Math/Natural Science Elective
16 sch		16 sch	

SECOND YEAR

3 sch	Refinishing III (ABT 2333)	4 sch	Frame and Underbody Structural Repair II (ABT 2524)
3 sch	Frame and Underbody Structural Repair I (ABT 2513)	3 sch	Collision Analysis and Estimation (ABT 2713)
4 sch	Body Panel and Upper Structural Repair II (ABT 2434)	3 sch	Vocational-Technical Elective†
3 sch	Fiberglass and Plastic Repair (ABT 2613)	3 sch	Oral Communications Elective
3 sch	Social/Behavioral Science Elective	3 sch	Humanities/Fine Arts Elective
16 sch		16 sch	

* Students who lack entry level skills in math, English, science, etc., will be provided related studies.

** Baseline competencies are taken from the high school Automotive Body Repair program. Students who can document mastery of these competencies should not receive duplicate instruction. Students who cannot demonstrate mastery will be required to do so.

† APPROVED ELECTIVES
Shop Operations and Procedures (ABT 2813)
Special Problem in Collision Repair Technology [ABT 291(1-3)]
Work-Based Learning in Collision Repair Technology [ABT 292(1-6)]

SECTION I:

BASELINE COMPETENCIES

BASELINE COMPETENCIES FOR COLLISION REPAIR TECHNOLOGY

The following competencies and suggested objectives are taken from the publication *Mississippi Curriculum Framework for Automotive Body Repair*. These competencies and objectives represent the baseline which was used to develop the community/junior college Collision Repair Technology courses. Students enrolled in postsecondary courses should either (1) have documented mastery of these competencies, or (2) be provided with these competencies before studying the advanced competencies in the Collision Repair Technology program.

Baseline competencies may be integrated into existing courses in the curriculum or taught as special "Introduction" courses. The "Introduction" courses may be taught for up to six semester hours of institutional credit and may be divided into two courses. If the Baseline Competencies are to be taught as "Introduction" courses, each course should be at least 3 credit hours. The following course number(s) and description should be used:

Course Name(s): Introduction to Collision Repair Technology, Introduction to Collision Repair Technology I, or Introduction to Collision Repair Technology II

Course Abbreviation(s): ABT 100(3-6), ABT 1013, ABT 1023

Classification: Vocational-Technical Core

Description: These courses contain the baseline competencies and suggested objectives from the high school Automotive Body Repair curriculum which directly relate to the community college Collision Repair Technology program. The courses are designed for students entering the community college who have had no previous training or documented experience in the field. (3-6 semester hours based upon existing skills for each student. May be divided into 2 courses for a maximum total of 6 hours of institutional credit.)

Competencies and Suggested Objectives:

1. Explain career opportunities for persons in automotive body repair.
   a. Describe the occupational outlook for automotive body technicians including employment opportunities, income, and changing technology.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M7
   Workplace Skills (See Appendix B) : WP1, WP2, WP3, WP6
2. Explain general shop safety requirements.
   a. Associate the Federal safety colors with their applications including red, green, yellow, black, white, orange, and blue.

b. Match fire extinguishers to the classes of fire each is best suited to extinguish including Class A (wood), Class B (flammable liquid), and Class C (electrical), and Class D (flammable metals).
c. Describe state eye safety law, including appropriate times for wearing safety glasses.
d. Describe rules for personal and general shop safety related to automotive body repair including hygiene, clothing, avoidance of horseplay, shop housekeeping, ventilation, safety equipment, location of fire safety and first aid equipment, shop layout, lifting and hoisting devices, vehicles, flammable liquids, hazardous materials, and pertinent safety codes.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6,S4, S5, S8

Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

3. Describe procedures for dealing with hazardous materials.
   a. Describe the "Right to Know Laws and Regulations" regarding hazardous materials contact.
   b. Describe methods for reducing hazardous waste including (1) substitute non-hazardous materials, (2) recycle waste, (3) re-use product, (4) use only amount of product needed, and (5) avoid stockpiling.
   c. Identify general procedures for storing hazardous materials and wastes including the following: (1) make sure that all containers are properly labeled at all times, (2) mark all containers containing hazardous waste materials with the words "**HAZARDOUS WASTE**" and with the date that the container was first used to store the waste, (3) store wastes and materials as described by the manufacturer, (4) make sure that containers are intact and secure at all times, and (5) keep all containers closed securely except when being filled or emptied.
   d. Identify the informational sections found on a Material Safety Data Sheet which provide guidelines for creating a safe work environment.
   e. Describe general first aid procedures to follow in case of an accident involving hazardous materials: (1) move the victim to fresh air; (2) check the container label, Material Safety Data Sheet, or other source for first aid procedures and begin first aid at once; (3) contact the person designated to help with first aid and evacuation procedures; (4) call an ambulance; (5) follow instructions from the designated person concerning further first aid and evacuation measures; (6) remain with the person until the ambulance arrives; (7) attach a Material Safety Data Sheet or other information on the material to the person's clothing prior to transport.
   f. Identify safety equipment to be used with hazardous materials including protection for eyes, respiratory system, body, and hands.
   g. Describe steps to follow in handling spills and waste disposal including (1) evacuate the area, (2) read container label, (3) call fire department (if flammable), (4) call manufacturer for clean-up instructions, (5) check

Fingertip Retrieval System (FRS) Manual, (6) use proper protection equipment, and (7) contain the flow of waste.

h. Identify agencies to be contacted in case of an accident or for more information on hazardous materials including National Response Center, EPA Regional Office, and Mississippi Department of Natural Resources.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, S4, S5, S8

Workplace Skills (See Appendix B): WP4, WP6

4. Explain the programs and activities of VICA which are beneficial to students in automotive body repair.
   a. Explain purposes of the Vocational Industrial Clubs of America (VICA) including development of common bond of fellowship and preparation for leadership in the world of work.
   b. Describe activities available to students in automotive body repair including competitions, leadership development program, club meetings, fund raisers, field trips, elected office leadership positions, and service projects.

   Related Academic Topics (See Appendix A): C3, C4

   Workplace Skills (See Appendix B): WP3, WP6
5. Explain the safe use of general hand tools used in automotive body repair.
   a. Identify general hand tools used in automotive body repair including wrenches, screwdrivers, pliers, hammers, chisels, body hammers, slide hammers, pull rods, suction cups, and dollies.
   b. Identify hand tools used for body filling and shaping including surform (cheese grader), bondo spreader (squeegee), and sanding blocks.
   c. Identify hand tools used for special body work including pop rivet gun, door handle removal tools, windshield knife, and interior and exterior trim removal tools.
   d. Identify types of eye safety protection including goggles, glasses, shields, welding goggles, and welding helmet.

   Related Academic Topics (See Appendix A): C1, C2, C4

   Workplace Skills (See Appendix B): WP5
6. Explain the safe use of power tools and stationary equipment.
   a. Identify and describe the safe use of hand-operated power tools including paint sprayer, pneumatic grinders, sanders, drills, and files.
   b. Identify and describe the safe use of portable and stationary power equipment including hydraulic body jacks, spray booth, frame alignment and straightening equipment, floor jacks, hoists, and drill press.

   Related Academic Topics (See Appendix A): C1, C2, C4

   Workplace Skills (See Appendix B): WP5, WP6
7. Explain components of automotive body construction.
   a. Identify components of the front-end assembly including fender, trim, molding, skirt, battery tray, hood, hood hinge, hood lock, hood catch, tie bar, stone shield, bumper radiator, shroud, and radiator support.

b. Identify types of suspensions including control arm and McPherson strut systems.
c. Identify major panels and components including front cowl, door section components, floor panel sections, rocker panel and pillar components, roof components, and rear body assembly.
d. Describe types of frame construction including unitized and conventional.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6
Workplace Skills (See Appendix B): WP2, WP6

8. Describe body and frame components using automotive reference texts and collision repair manuals.
   a. Identify body and frame components using automotive reference texts, collision repair manuals, and computerized collision repair software.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6
   Workplace Skills (See Appendix B): WP2, WP6
9. Explain safe use of oxyacetylene cutting equipment.
   a. Describe welding safety rules including protection of eyes, body, hands, and feet and prevention of fire hazards.
   b. Identify components of oxyacetylene cutting equipment including the major parts of the tanks, hoses, regulators, and torch body.
   c. Compare the differences between flashback and backfire including the sound produced and flame behavior of each.
   d. Describe the steps to follow in case of flashback.

   Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, S4, S8
   Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6
10. Utilize oxyacetylene cutting equipment.
    a. Set up equipment for oxyacetylene cutting, including tanks, regulators, hoses, torch body, and tip selection.
    b. Turn on, light, adjust, and turn off oxyacetylene welding equipment including adjustment for carburizing, oxidizing, and neutral flames.
    c. Operate oxyacetylene cutting equipment to cut mild steel according to industry standards.

    Related Academic Topics (See Appendix A): C3, C4, C5, C6
    Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6
11. Explain the principles of operation of gas metal arc welding (GMAW).
    a. Identify the major components of a gas metal arc welding (GMAW) unit including flowmeter, shielding, timing and control panel, power supply, wire-feed system, torch gun, trigger, and ground.
    b. Demonstrate the operation of GMAW equipment, including starting of an arc and maintaining a bead.
    c. Demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.

    Related Academic Topics (See Appendix A): C3, C4, C5, C6, S8
    Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6

12. Explain procedures for identifying damage and plans for repair of sheet metal.
    a. Describe the steps in assessing and repair of automotive body metal damage according to the order of performance.
    b. Identify classes of metal damage including buckle, wrinkle, and gouge.
    c. Describe the purpose of preparing a surface for metal repair including why the surface must be clean.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6
    Workplace Skills (See Appendix B): WP4, WP5, WP6
13. Apply the procedures for repair of damaged sheet metal.
    a. Prepare exterior and interior metal surfaces for repair including the amount of surface that should be prepared on an exterior and an interior panel surface according to industry practices and specifications.
    b. Describe the effects of bending automotive body sheet metal including strengthening and weakening of the sheet metal panel.
    c. Bump out a panel using a hammer and dolly and bumping or slapping spoon according to industry standards.
    d. Identify grinding techniques used in metal finishing including the patterns used to promote adhesion.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6
    Workplace Skills (See Appendix B): WP4, WP5, WP6
14. Demonstrate basic techniques used in metal finishing according to industry standards.
    a. Interpret safety rules for using body fillers including protective clothing, procedures, and cautions.
    b. Describe guidelines for mixing and applying body fillers including mixing ratios, mixing procedures, and shop temperature.
    c. Prepare a steel metal panel and use plastic body filler to repair the panel according to industry standards.

    Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M4
    Workplace Skills (See Appendix B): WP4, WP5, WP6
15. Apply procedures for sanding and grit selection.
    a. Describe the purposes of sanding including promotion of adhesion and removal of rough surfaces.
    b. Select appropriate grit for the finish being applied.
    c. Describe the purpose of featheredging including tapering of broken paint and sanding scratches.
    d. Compare the characteristics of wet and dry sanding including dust, paper clog, panel inspection, sanding scratches, and speed of masking.
    e. Describe guidelines for hand sanding including sanding in one direction, use of sanding block, and application of even pressure.
    f. Featheredge broken paint according to industry standards.
    g. Wet sand for a complete paint job according to industry standards.
    h. Dry sand for a complete paint job according to industry standards.
    i. Scuff-sand a surface according to industry standards.

Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, S8
Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6

16. Apply procedures for masking.
    a. Describe guidelines for effective use of masking tape and paper including application and removal.
    b. Mask a vehicle for panel or a complete paint job according to industry standards.

Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6
Workplace Skills (See Appendix B): WP3, WP4, WP5, WP6

17. Explain general shop safety requirements.
    a. Associate the Federal safety colors with their applications including red, green, yellow, black, white, orange, and blue.
    b. Match fire extinguishers to the classes of fire each is best suited to extinguish including Class A (wood), Class B (flammable liquid), and Class C (electrical), and Class D (flammable metals).
    c. Describe state eye safety law, including appropriate times for wearing safety glasses.
    d. Describe rules for personal and general shop safety related to automotive body repair including hygiene, clothing, avoidance of horseplay, shop housekeeping, ventilation, safety equipment, location of fire safety and first aid equipment, shop layout, lifting and hoisting devices, vehicles, flammable liquids, hazardous materials, and pertinent safety codes.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, S4, S5, S8
Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

18. Describe procedures for dealing with hazardous materials.
    a. Describe the "Right to Know Laws and Regulations" regarding hazardous materials contact.
    b. Describe methods for reducing hazardous waste including (1) substitute non-hazardous materials, (2) recycle waste, (3) re-use product, (4) use only amount of product needed, and (5) avoid stockpiling.
    c. Identify general procedures for storing hazardous materials and wastes including the following: (1) make sure that all containers are properly labeled at all times, (2) mark all containers containing hazardous waste materials with the words "**HAZARDOUS WASTE**" and with the date that the container was first used to store the waste, (3) store wastes and materials as described by the manufacturer, (4) make sure that containers are intact and secure at all times, and (5) keep all containers closed securely except when being filled or emptied.
    d. Identify the informational sections found on a Material Safety Data Sheet which provide guidelines for creating a safe work environment.
    e. Describe general first aid procedures to follow in case of an accident involving hazardous materials: (1) move the victim to fresh air; (2) check the container label, Material Safety Data Sheet, or other source for first

aid procedures and begin first aid at once; (3) contact the person designated to help with first aid and evacuation procedures; (4) call an ambulance; (5) follow instructions from the designated person concerning further first aid and evacuation measures; (6) remain with the person until the ambulance arrives; (7) attach a Material Safety Data Sheet or other information on the material to the person's clothing prior to transport.

f. Identify safety equipment to be used with hazardous materials including protection for eyes, respiratory system, body, and hands.

g. Describe steps to follow in handling spills and waste disposal including (1) evacuate the area, (2) read container label, (3) call fire department (if flammable), (4) call manufacturer for clean-up instructions, (5) check Fingertip Retrieval System (FRS) Manual, (6) use proper protection equipment, and (7) contain the flow of waste.

h. Identify agencies to be contacted in case of an accident or for more information on hazardous materials including National Response Center, EPA Regional Office, and Mississippi Department of Natural Resources.

Related Academic Topics (See Appendix A): C3, C4
Workplace Skills (See Appendix B): WP3, WP6

19. Explain automotive hardware, glass, fasteners and trim.
    a. Identify typical interior door components and hardware including door handle, door rest, side mirror regulator, window regulator, door knob lock, weather strip, ash tray, and door latch.
    b. Identify typical door glass hardware including regulator, control arms, and glass track.
    c. Identify the weather stripping on a door including how the weather stripping seals the interior from outside elements.

    Related Academic Topics (See Appendix A): C1, C2, C3, C4
    Workplace Skills (See Appendix B): WP2, WP4

20. Apply procedures for disassembly and assembly of manual doors.
    a. Describe the methods used for mounting interior handles including clip-attached and screw-attached types.
    b. Remove and replace interior door trim panel according to manufacturer's specifications using door trim tools.

    Related Academic Topics (See Appendix A): C1, C3, C4
    Workplace Skills (See Appendix B): WP2, WP3, WP4, WP5,WP6

21. Explain procedures to repair body and frame construction.
    a. Identify major parts of unitized and conventional frames including: (1) unitized parts such as header bar, windshield, pillar, strut tower, front rail, front body, hinge pillar, rocker panel, and center panel and (2) conventional parts such as stud frame section, front cross member, side rail, and rear cross member.
    b. Describe the different types of frame and unitized body damage including diamond, twist, sag, and sway.
    c. Identify the frame repair control points including front, center, and rear.

Related Academic Topics (See Appendix A): C1, C2, C4, C6
Workplace Skills (See Appendix B): WP2, WP3, WP6

22. Explain the components of gas metal arc welding (GMAW).
    a. Identify the major components of a GMAW welding unit including solid wire electrode, gas cylinder, timing and control panel, power supply, wire-feed system, torch gun, and ground clamp.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C6, S5, S8
Workplace Skills (See Appendix B): WP2, WP4

23. Operate a GMAW system.
    a. Set up a spool-type wire feeder for GMAW welding according to industry standards.
    b. Demonstrate safety procedures associated with the operation of GMAW equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.
    c. Set up a flowmeter regulator for GMAW shielding gases according to industry standards.
    d. Use a GMAW welder to lay stringer beads, construct a fillet weld, plug weld, and weld a lap joint on automotive type steel.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, S5, S8
Workplace Skills (See Appendix B): WP2, WP4

24. Set up and operate a plasma arc cutter (PAC).
    a. Identify the major components of a PAC.
    b. Adjust airflow and temperature settings.
    c. Demonstrate safety procedures associated with the operation of PAC equipment, including eye and body protection, electrical grounding, and handling of compressed gas supply.
    d. Operate a PAC to cut automotive body sheet metal.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, S5
Workplace Skills (See Appendix B): WP2, WP4

25. Explain choices or options for correction of structural panel damage.
    a. Describe options for repair, replace, or total for correction of structural panel damage.

Related Academic Topics (See Appendix A): C1, C3, M1
Workplace Skills (See Appendix B): WP2

26. Explain procedures for heat treating sheet metal panels.
    a. Interpret guidelines for heat shrinking sheet metal including the manufacturer's recommendations for high strength steels.
    b. Observe the proper method for heat shrinking sheet metal according to industry standards.

Related Academic Topics (See Appendix A): C1, C2, M4, S6
Workplace Skills (See Appendix B): WP4

27. Explain procedures for repairing major damage.
    a. Describe the different types of structural panel assembly methods.

b. Describe methods for removing welded panels including a drill, air chisel, saws, and spot weld cutter.
c. Remove and reinstall bolted on assemblies, including door, trunk lid, and hood.

Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, M4
Workplace Skills (See Appendix B): WP5, WP6

28. Apply procedures to perform fiberglass and plastic repairs.
    a. Describe safety precautions to observe when working with fiberglass including wear of rubber gloves and a respirator, work in a well-ventilated area, have fire extinguisher on standby, mix only amount needed, read all instructions on labels, and use thinners with caution.
    b. Describe the advantages of fiberglass in automotive body construction.
    c. Describe the two types of plastics and repair procedures including thermoset plastic and thermoplastic.
    d. Perform a fiberglass repair.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, M4, M7, S5
    Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
29. Apply procedures for alignment of body panels.
    a. Describe the purpose of aligning detachable parts including proper panel gap, seal, and fit.
    b. Align a body panel according to manufacturer's specifications.

    Related Academic Topics (See Appendix A): C1, C2, C3, C5, C6
    Workplace Skills (See Appendix B): WP4, WP5, WP6
30. Apply procedures for spray painting.
    a. Describe general safety rules for using spray paint equipment including reading labels, safe use of the compressor, avoiding contact with bare skin, turning off power before servicing, using correct electrical outlets, wearing protective clothing and respirator, and proper ventilation requirements.
    b. Describe the tools and equipment used in automotive refinishing including spray gun, blow gun, air regulator, air compressor, paint paddle, viscosity cup, paint strainer, apron taper, paint booth, and panel drying system.
    c. Identify the parts of a spray gun including air cap, fluid tip, needle valve, fluid adjustment screw, fan adjustment screw, and body.
    d. Set up a spray gun: (1) thin the paint; (2) fill the spray gun; and (3) set for correct pressure, fan pattern, and fluid flow according to manufacturer's specifications and industry standards.
    e. Clean a spray gun according to manufacturer's specifications.

    Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M1, M4, S5, S8
    Workplace Skills (See Appendix B): WP4, WP5

31. Explain different types of paints and undercoatings.
    a. Describe the different types of paint undercoats and guidelines for quality undercoating including primer, primer surfacer, primer sealer, non-sanding sealers, and etching primers.
    b. Describe procedures for quality undercoating according to industry standards.
    c. Describe the types of finishes used on today s vehicles including acrylic, enamel, urethane, and acrylic urethane.
    d. Describe the different types of coat application techniques including mist coat, single coat, medium wet coat, double coat, and banding coat.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, S5
    Workplace Skills (See Appendix B): WP2, WP4
32. Perform application of paints and undercoatings.
    a. Describe guidelines for preventing dirty paint including keeping vehicle clean, wetting paint booth floor, using clean equipment, wearing clean clothes, using clean gun, and using clean masking materials.
    b. Mix and apply a primer-surfacer, guide coat, and sealer according to manufacturer's specifications.
    c. Participate in a complete paint job according to industry standards and paint manufacturer's specifications.
    d. Measure paint thickness using a mil gauge.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, M1, M4, S5
    Workplace Skills (See Appendix B): WP4, WP5
33. Apply automotive detailing procedures.
    a. Describe safety precautions to observe when using volatile cleaners including wearing gloves, safety glasses, particle mask, and protective clothing and having a well-ventilated area.
    b. Detail a complete body paint job according to industry standards and instructor's satisfaction.

    Related Academic Topics (See Appendix A): C1, C3, C4, C5, C6, S5
    Workplace Skills (See Appendix B): WP2, WP3, WP4, WP5, WP6

SECTION II:

CURRICULUM GUIDE

FOR

COLLISION REPAIR TECHNOLOGY

COLLISION REPAIR TECHNOLOGY COURSES

Course Name: Restraint Systems and Interior Trim

Course Abbreviation: ABT 1113

Classification: Vocational-Technical Core

Description: A course to provide skills and practices in vehicle restraint systems and interior trim. Included are procedures for servicing restraint systems, passive restraint systems, headliners, and carpets; and procedures for operation of an air bag restraint system. (3 sch: 1 hr. lecture, 4 hr. lab)

Prerequisites: None

Competencies and Suggested Objectives:

1. Apply procedures for servicing active restraint systems.
   a. Inspect, remove, and install seat belts and shoulder harness assembly and components according to manufacturer's recommendations.
   b. Inspect restraint system mounting areas for damage.
   c. Repair restraint system mounting area damage.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Apply procedures for servicing passive restraint systems.
   a. Remove, inspect, and replace tracks and drive assembly, lap retractor, and inboard buckle-lap retractor.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Explain the operation of an air bag restraint system.
   a. Describe the operation of an air bag restraint system.
   b. Locate all air bag activation sensors.
   c. Describe procedures to disarm an air bag.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
4. Apply procedures to service headliners.
   a. Identify the sequence for installing a headliner.
   b. Remove interior trim and headliner.
   c. Install a headliner.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
5. Apply procedures to service carpets.
   a. Identify the sequence for installing carpet.
   b. Remove seats, interior trim, and carpet.
   c. Install carpet.
   d. Install seats and interior trim.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5
Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Course Name: Bolted Units, Assemblies, and Electrical Systems

Course Abbreviation: ABT 1123

Classification: Vocational-Technical Core

Description: A course which provides instruction in practice in the removal and replacement of bolted parts, sub-units, and assemblies. Methods of disassembly and reassembly, part adjustment, alignment, and electrical system service and repair are included in this course. (3 sch: 1 hr. lecture, 4 hr. lab)

Prerequisites: None

Competencies and Suggested Objectives:

1. Remove and replace bolted-on body units.
   a. Remove and replace bolted body panels.
   b. Remove and replace a radiator support.
   c. Remove and replace a bumper assembly.
   d. Remove and replace an energy absorber.
   e. Remove and replace a door unit.
   f. Remove and replace a radiator.
   g. Remove and replace a condenser.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, S6, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Remove and replace electrical components.
   a. Diagnose problems with lights and electrical components.
   b. Remove and replace an electric fan assembly.
   c. Remove and replace a light panel.
   d. Remove and replace a wiring harness and/or circuit.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Course Name: Glass and Related Hardware Installation and Sealing

Course Abbreviation: ABT 1133

Classification: Vocational-Technical Core

Description: A course in the removal and replacement of stationary and movable glass. Included are the alignment of movable glass and the repair and alignment of glass mounting hardware. Also included are the sealing and adjustments needed to eliminate water leaks and wind noise. (3 sch: 1hr. lecture, 4 hr. lab)

Prerequisites: None

Competencies and Suggested Objectives:

1. Identify different types of glass used in automobiles.
   a. Describe laminated and tempered glass.
   b. Describe modular and solar glass.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5 ,
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Service electric power window motors.
   a. Troubleshoot electric glass control components.
   b. Repair and/or replace electric power window motors.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Apply procedures for installation of stationary glass.
   a. Perform the short method of installation.
   b. Perform the long method of installation.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
4. Identify the two types of windshield sealers.
   a. Describe the butyl sealer.
   b. Describe the urethane sealer.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, S6, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
5. Apply procedures to install and adjust movable glass units.
   a. Install and adjust electrical type movable glass.
   b. Install and adjust manual type movable glass.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
6. Apply procedures for installation of gasket type glass.
   a. Remove old gasket and clean surfaces.
   b. Install sealer and gasket.
   c. Install gasket type glass.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5
Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

7. Apply procedures to locate and prevent wind and noise leaks.
   a. Describe the process for locating wind noise and water leaks.
   b. Identify common areas of an automobile where wind noise and water leaks are most common.
   c. Describe the most common causes of wind noise and water leaks.
   d. Describe the use of materials and tools used to repair wind noise and water leaks.
   e. Repair wind noise and water leaks in various locations on automotive bodies.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5
   Workplace Skills (See Appendix B): WP1, WP2 WP3, WP4, WP5, WP6

Course Name: Automotive Body Welding and Cutting

Course Abbreviation: ABT 1213

Classification: Vocational-Technical Core

Description: A course designed to provide specialized skills and practice in automotive body welding and cutting. Includes instruction in the use of the Gas Metal Arc Welding (GMAW) equipment and plasma arc cutter (PAC) in repairing the high strength steels used in unibody construction. (3 sch: 1 hr. lecture, 4 hr. lab)

Prerequisites: None

Competencies and Suggested Objectives:

1. Apply skills and practices in plasma arc cutting.
   a. Identify parts of PAC equipment.
   b. State and apply safety precautions to be followed in using PAC equipment.
   c. Associate common plasma cutting problems to their probable causes.
   d. Set up PAC equipment and cut steel.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M1, M6, M7, S5, S6, S8

   Workplace Skills (See Appendix B): WP1, WP2, WP4, WP5, WP6
2. Apply skills and practices in Gas Metal Arc Welding (GMAW) of high strength steels used in unibody construction.
   a. Set up GMAW welding equipment.
   b. Lay stringer beads in the flat position.
   c. Construct a lap joint weld in the flat and vertical position.
   d. Construct a T-joint fillet weld in the flat and vertical position.
   e. Construct a butt joint weld in the flat and vertical position with the use of an insert.
   f. Set up GMAW welder and perform spot welding.
   g. Set up GMAW welder and perform plug welding.
   h. Apply safety precautions to be followed in using GMAW equipment.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M1, M2, M4, M6, M7, S4, S5, S6

   Workplace Skills (See Appendix B): WP1, WP2, WP4, WP5, WP6
3. Protect computer and electrical components from damage by electrical charges produced by PAC and GMAW processes.
   a. Identify locations of computer and electrical components which should be protected during cutting or welding processes.
   b. Remove and replace computers and electrical components which may be damaged by welding processes.

Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M1, M2, M4, M6, M7, S4, S5, S6
Workplace Skills (See Appendix B): WP1, WP2, WP4, WP5, WP6

Course Name: Refinishing I

Course Abbreviation: ABT 1313

Classification: Vocational-Technical Core

Description: A course to provide skills and practices in vehicle preparation, cleaning, sanding, metal treatment, and masking. Included is determining imperfections in paint jobs. (3 sch: 2 hr. lecture, 2 hr. lab)

Prerequisites: None

Competencies and Suggested Objectives:

1. Analyze existing automobile paint type and condition.
   a. Comply with personal and environmental safety practices associated with automotive refinishing.
   b. Determine the vehicle identification number and proper paint code for a given vehicle from the vehicle identification plate.
   c. Explain the uses and properties of paint used in vehicle topcoats and undercoats.
   d. Define the components of automobile paint including pigment metallic flakes, binder, solvent, and additives.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, S6, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Prepare an automobile for refinishing.
   a. Remove and store trim and molding.
   b. Dry or wet sand areas to be refinished.
   c. Featheredge broken areas to be refinished.
   d. Identify type of metal and apply suitable metal treatment.
   e. Mask trim and protect other areas that will not be refinished.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, S6, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Determine automotive paint problems, including causes and solutions.
   a. Identify and provide solutions to paint problems such as blistering, fish eye, crazing, sags and runs, solvent popping, overspray, and orange peel in the finish.
   b. Identify and correct the problem of mottling or streaking in metallic and mica paint finishes.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M7, S6, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
4. Determine failure of automotive painting and provide causes and solutions.
   a. Identify sandscratch swelling and its causes.
   b. Identify tape tracking and its causes.

c. Identify loss of gloss and its causes.
d. Identify poor adhesion and its causes.
e. Identify crowfeet or line-checking and its causes.
f. Identify water spotting and its causes.
g. Identify acid raid and its causes.
h. Identify die back and its causes.
i. Identify oxidation and its causes.
j. Identify staining and its causes.

Related Academic Topics (See Appendix A): C1, C2, C3, C4,C5, M7, S6, S8
Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Course Name: Refinishing II

Course Abbreviation: ABT 1324

Classification: Vocational-Technical Core

Description: A continuation of Refinishing I. Included are types of refinish materials and their specific application procedures. Included are ways to prevent painting problems, solving problems that occur, basic blending for color matching, and basecoat/clearcoat applications. (4 sch: 2 hr. lecture, 4 hr. lab)

Prerequisites: Refinishing I (ABT 1313)

Competencies and Suggested Objectives:

1. Identify the parts, disassemble, and clean a paint gun.
   a. Identify the parts of a spray gun.
   b. Disassemble, clean, and rebuild a spray gun.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, S6, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Operate a spray gun.
   a. Demonstrate technique for operating a spray gun including gun arc, gun distance, gun speed, spray pattern, and overlap for finish being applied.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Demonstrate spray technique.
   a. Make a test panel according to manufacturer's specifications and check for color match.
   b. Make a let down test panel for a three stage color match.
   c. Apply a single stage topcoat for blending a single panel.
   d. Apply a basecoat/clearcoat for spot and panel blending on an overall refinishing.
   e. Identify the types of rigid, flexible, and plastic parts to be refinished; including determining the material and refinishing procedures.
   f. Refinish a rigid, flexible, or plastic part.
   g. Tint a color using a formula to achieve a blended match.
   h. Discuss methods of color matching, including computer analysis.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, S6, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Course Name: Sheet Metal Repair

Course Abbreviation: ABT 1414

Classification: Vocational-Technical Core

Description: A course designed to provide instruction and practice in the repair of the sheet metal components of the vehicle body. Includes practice in selecting and applying various method and tools of the trade used in removing dents and other damage conditions from sheet metal panels. Also included are constructing and installing simple metal patch panels, and making basic repairs. (4 sch: 2 hr. lecture, 4 hr. lab)

Prerequisites: None

Competencies and Suggested Objectives:

1. Apply methods of repair and use tools to rough out auto body panels.
   a. Use hammer and dolly to rough out a panel.
   b. Use pull rods or slide hammer to rough out a panel.
   c. Use pry pick to rough out a panel.
   d. Use a body spoon to rough out a panel.
   e. Use vacuum cups to rough out a panel.
   f. Use heat shrinking methods to rough out a panel.
   g. Use cold shrinking methods to rough out a panel.
   h. Apply pressure and tension in relation to panel shape and reinforcement.
   i. Repair sheet metal using welded stud repair methods.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M1, M4, M5 S4, S5, S6, S8

   Workplace Skills (See Appendix B): WP1, WP2, WP4, WP5, WP6
2. Perform simple sheet metal repairs.
   a. Use body filler to make simple sheet metal repairs.
   b. Use fiberglass to make panel repair.
   c. Use sheet metal patch to make panel repair.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M1, M4, M5, S4, S5, S6, S8

   Workplace Skills (See Appendix B): WP1, WP2, WP4, WP5, WP6

Course Name: Body Panel and Upper Structural Repair I

Course Abbreviation: ABT 1423

Classification: Vocational-Technical Core

Description: A course in the repair and replacement of major body panels and upper body structural components. Instruction will include the use of power equipment, basic anchoring and pulling, non-adjustable panel alignment, and attachment (welded or bonded). (3 sch: 1 hr. lecture, 4 hr. lab)

Prerequisites: Sheet Metal Repair (ABT 1414)

Competencies and Suggested Objectives:

1. Analyze body panel upper structural damage.
   a. Identify tools used in body panel upper structural repair.
   b. Describe uses of alignment gages and types of gages.
   c. Utilize technical manuals to obtain specifications for alignment.
   d. Identify upper body components.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Perform body panel upper structural damage repair.
   a. Tie down auto for alignment.
   b. Make a minor upper body repair.
   c. Analyze and apply use of corrective forces (pressure or tension) to body panel upper structural damage.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, M7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Course Name: Refinishing III

Course Abbreviation: ABT 2333

Classification: Vocational-Technical Core

Description: A continuation of Refinishing II with emphasis on advanced techniques; including, pinstriping, decals, lettering, color sanding, buffing, polishing, and detailing. (3 sch: 1 hr. lecture, 4 hr. lab)

Prerequisites: Refinishing II (ABT 1324)

Competencies and Suggested Objectives:

1. Color sand, buff, and polish.
   a. Color sand according to paint manufacturer's specifications (1,000 to 2,000 grit sandpaper).
   b. Buff using buffing machine with white medium ribbon compound.
   c. Identify and correct buffing related imperfections, swirl marks, and wheel burns.
   d. Remove overspray.
   e. Polish auto using non-silicon car polish.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Prepare vehicle for delivery to customer.
   a. Wash and clean auto.
   b. Clean body openings (door jambs and edges).
   c. Clean glass.
   d. Clean interior of auto.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Remove and replace pinstriping, decals, and lettering.
   a. Remove pinstriping, decals, and lettering.
   b. Apply pre-cut adhesive backed tape for pinstriping, decals, and lettering.
   c. Mask and apply spray painted stripes, decals, and lettering.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP4, WP5, WP6

July 30, 1996

Course Name: Body Panel and Upper Structural Repair II

Course Abbreviation: ABT 2434

Classification: Vocational-Technical Core

Description: A continuation of Body Panel and Structural Repair I. Emphasis will continue to be placed on major panel replacement. Instruction will include rolled over vehicle repair, structural alignment and roof panel replacement, and the replacement or sectioning of upper structural members. (4 sch: 2 hr. lecture, 4 hr. lab)

Prerequisite: Body Panel and Upper Structural Repair I (ABT 1423)

Competencies and Suggested Objectives:

1. Plan for repair and replacement of body panel upper structural damage.
   a. Plan a repair sequence for body panel and upper structural damage.
   b. Use specifications to determine proper hook-up for body straightening.
   c. Pull auto to specifications.
   d. Replace a major welded-on body panel.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Course Name: Frame and Underbody Structural Repair I

Course Abbreviation: ABT 2513

Classification: Vocational-Technical Core

Description: An introduction to frame repair. Instruction includes analyzing frame, structural, suspension, and steering damage, and setting up alignment equipment. (3 sch: 1 hr. lecture, 4 hr. lab)

Prerequisites: None

Competencies and Suggested Objectives:

1. Explain functions of components of frame, steering, and suspension.
   a. Describe the functions of frame components.
   b. Describe the functions of steering components.
   c. Describe the functions of suspension components.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Explain types of damage to frame.
   a. Analyze types of frame damage including diamond, mash, sidesway, twist, and sag.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Explain procedures for frame alignment.
   a. Describe major actions performed during frame alignment.
   b. Identify guidelines for the operation of frame alignment equipment.
   c. Describe the sequence of troubleshooting frame damage.
   d. Describe caster, camber, and toe in.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M7
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
4. Set up frame alignment equipment.
   a. Set up a pull to align a conventional frame.
   b. Set up a pull to align a unibody.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M7
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Course Name: Frame and Underbody Structural Repair II

Course Abbreviation: ABT 2524

Classification: Vocational-Technical Core

Description: This course continues instruction from Frame and Underbody Structural Repair I. Emphasis is placed on unibody vehicle construction. Included are welding in unibody repair and repairing/replacing/sectioning structural components. (4 sch: 1 hr. lecture, 6 hr. lab)

Prerequisites: Frame and Underbody Structural Repair I (ABT 2513)

Competencies and Suggested Objectives:

1. Restore corrosion protection.
   a. Apply primers.
   b. Apply undercoats.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, S6, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Explain procedures for repair of frame and underbody damage.
   a. Identify types of damage.
   b. Describe the proper procedures to section an underbody component.
   c. Repair or replace an underbody component.
   d. Remove and replace mechanical components.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M7
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Align frame and underbody components.
   a. Align a convention frame.
   b. Align a unibody frame.
   c. Remove and replace steering and suspension components.
   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M7
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Course Name: Fiberglass and Plastic Repair

Course Abbreviation: ABT 2613

Classification: Vocational-Technical Core

Description: A course designed to provide theory and practice in the repair of fiberglass, plastic, and sheet molded compounds. (3 sch: 1 hr. lecture, 4 hr. lab)

Prerequisites: None

Competencies and Suggested Objectives:

1. Apply procedures for fiberglass repair.
   a. Describe safety precautions to follow when working with fiberglass.
   b. Describe guidelines for proper repair of fiberglass panels and parts.
   c. Repair minor surface damage to a fiberglass panel.
   d. Repair a crack in a fiberglass panel.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, S5, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Apply procedures for repairs on sheet molded compounds.
   a. Identify sheet molded compound materials used in automotive body construction.
   b. Make repairs to sheet molded compound materials using structural and cosmetic fillers.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, S6, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
3. Perform repairs on plastic automotive panels.
   a. Identify types of plastic materials used in automotive panel construction.
   b. Use cosmetic fillers to make repairs on plastic automotive panels.
   c. Repair holes and cuts in rigid and flexible plastic parts using backing materials and adhesives.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, S6, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

July 30, 1996

Course Name: Collision Analysis and Estimation

Course Abbreviation: ABT 2713

Classification: Vocational-Technical Core

Description: This course covers the complete inspection and analysis of damaged vehicles. It is designed to enable the student to determine the conditions and severity of the damage, the repair or replacement of parts, the estimated repair time, and correct use of reference manuals. (3 sch: 2 hr. lecture, 2 hr. lab)

Prerequisite: None

Competencies and Suggested Objectives:

1. Explain procedures for use of collision and reference manuals.
   a. Demonstrate the use of repair manuals and estimating systems crash books, parts books, and flat rate manuals, including computerized systems.
   b. Discuss legal aspects of body repair.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M7
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Explain practices for analyzing damage and estimating repair procedures utilizing manual and computerized systems.
   a. Discuss factors to consider in determining whether to replace or repair a part.
   b. Estimate time required for repair or replacement of parts.
   c. Prepare estimates for various body repair jobs.
   d. Discuss factors to consider in determining whether to repair or "total" a vehicle.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M7
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Course Name: Shop Operations and Procedures

Course Abbreviation: ABT 2813

Classification: Vocational-Technical Elective

Description: An introduction to small business management techniques as applied to the collision repair shop. Includes computerized information and record systems. Also included are financial responsibilities, shop layout, inventory, and employee-employer relations. (3 sch: 2 hr. lecture, 2 hr. lab)

Prerequisite: None

Competencies and Suggested Objectives:

1. Explain procedures for the operation of a collision repair business.
   a. Describe the operation of a small business.
   b. Describe financial records required by small businesses.
   c. Complete forms and records used in automotive body repair using computer equipment and software.
   d. Describe procedures and forms for taking and maintaining an inventory.
   e. Describe practices for maintaining good employer/employee relationships.
   f. Describe legal responsibilities of a collision repair shop owner.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6, M7
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6
2. Explain layout of a collision repair shop.
   a. Describe location of office area.
   b. Describe metal work.
   c. Describe paint area.
   d. Describe preparation area.
   e. Describe drying area.
   f. Describe the make ready area.
   g. Describe parts and storage areas.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, M7
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

July 30, 1996

Course Name: Special Problem in Collision Repair Technology

Course Abbreviation: ABT 291(1-3)

Classification: Vocational-Technical Elective

Description: A course to provide students with an opportunity to utilize skills and knowledge gained in other Collision Repair Technology courses. The instructor and student work closely together to select a topic and establish criteria for completion of the project. (1-3 sch: 2-6 hr. lab)

Prerequisite: Sophomore standing in Collision Repair Technology

Competencies and Suggested Objectives:

1. Prepare a written agreement.
   a. Compile a written training agreement in cooperation with the instructor and student which details work schedule and specific tasks/skills to be mastered in the program.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4, C5, C6
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP6
2. Prepare a written report of activities.
   a. Compile a daily log of activities and tasks.
   b. Submit weekly reports to the instructor summarizing activities and tasks completed.
   c. Submit a final report of activities and experiences.

   Related Academic Topics (See Appendix A): C1, C2, C4, C6
   Workplace Skills (See Appendix B): WP1, WP2, WP6
3. Follow written guidelines for special problems.
   a. Complete all required activities in the training agreement.
   b. Adhere to all written and oral instructions for special problems.

   Related Academic Topics (See Appendix A): C1, C2, C3, C4,C5, M7, S8
   Workplace Skills (See Appendix B): WP1, WP2, WP3, WP4, WP5, WP6

Course Name: Work-Based Learning in Collision Repair Technology

Course Abbreviation: ABT 292(1-6)

Classification: Vocational-Technical Elective

Description: This course is a cooperative program between industry and education and is designed to integrate the student's technical studies with industrial experience. Variable credit is awarded on the basis of one semester hour per 45 industrial contact hours. (1-6 sch: 3-18 hr. externship)

Prerequisite: Sophomore standing in Collision Repair Technology

Competencies and Suggested Objectives:

1. Apply technical skills needed to be a viable member of the work force.
   a. Prepare a description of technical skills to be developed in the work-based learning program.
   b. Develop technical skills needed to be a viable member of the work force.

   Related Academic Topics (See Appendix A): C5, C6
   Workplace Skills (See Appendix B): WP1
2. Apply skills developed in other program area courses.
   a. Perform skills developed in other program area courses in the work-based learning program.

   Related Academic Topics (See Appendix A): C5, C6
   Workplace Skills (See Appendix B): WP5, WP6
3. Apply human relationship skills.
   a. Use pro-active human relationship skills in the work-based learning program.

   Related Academic Topics (See Appendix A): C5, C6
   Workplace Skills (See Appendix B): WP3
4. Apply and practice positive work habits and responsibilities.
   a. Perform assignments to develop positive work habits and responsibilities.

   Related Academic Topics (See Appendix A): C5, C6
   Workplace Skills (See Appendix B): WP3
5. Work with instructor and employer to develop written occupational objectives to be accomplished.
   a. Perform written occupational objectives in the work-based learning program.

   Related Academic Topics (See Appendix A): C5, C6
   Workplace Skills (See Appendix B): WP6
6. Assess accomplishment of objectives.
   a. Prepare daily written assessment of accomplishment of objectives.

b. Present weekly written reports to instructor in activities performed and objectives accomplished.

Related Academic Topics (See Appendix A): C5, C6
Workplace Skills (See Appendix B): WP6

7. Utilize a set of written guidelines for the work-based learning program.
   a. Develop and follow a set of written guidelines for the work-based learning program.

Related Academic Topics (See Appendix A): C5, C6
Workplace Skills (See Appendix B): WP6

SECTION III:

RECOMMENDED TOOLS AND EQUIPMENT

RECOMMENDED TOOLS AND EQUIPMENT FOR POSTSECONDARY COLLISION REPAIR TECHNOLOGY

1. Bench, steel work (6)
2. Blade, razor scraper (5)
3. Block, sanding short (6)
4. Block, sanding long (6)
5. Board, file (6)
6. Booth, down draft heated paint (1)
7. Brush, striping (1)
8. Brush, wire (4)
9. Cables, jumper (1)
10. Chains, bumper (1)
11. Charger, battery (1)
12. Chisel set, assorted metal (1)
13. Chuck, air (2)
14. Clamp, welder (vise grip) (6)
15. Clamp, sheet metal (vise grip) (6)
16. Clamp set, assorted body (2)
17. Clamp, C-clamp (vise grip) (3") (2)
18. Clamp, C-clamp (vise grip) (7") (2)
19. Clamp, C-clamp (vise grip) (11") (2)
20. Clamp, C-clamp (vise grip) (18") (2)
21. Cleaner, high pressure (1)
22. Cleaner, vacuum (1)
23. Come-along (2T) (2)
24. Compressor, air (25 hp screw) (1)
25. Computer w/operating software w/multimedia kit (1)
26. Cord, extension (50') (4)
27. Cover, fender (4)
28. Cover, wheel (set of 4) (2)
29. Cup, viscosity (#2 Zahn) (1)
30. Cutter, sheet metal, hand (2)
31. Cutter, sheet metal, power (1)
32. Cutter set, panel (air drive) (1)
33. Cutter, disc (1)
34. Dollies set, assorted (4)
35. Drill, electric (⅜") (1)
36. Drill set, twist (2)
37. Drill, pneumatic (⅜") (2)
38. Drill, electric (½") (1)
39. Driver, hand impact (⅜" drive) (3)
40. Dryer, infrared paint (4)
41. Extractor set, screw (Easy Out) (1)

42. File, air (orbital or straight line) (6)
43. File, body round (2)
44. File, body flat (2)
45. Gauge, tram (1)
46. Gauge set of 4, center line (1)
47. Gloves, cutting goggles (4)
48. Gloves, pair welding (4)
49. Goggles, safety (6)
50. Grater, cheese (24)
51. Grinder, bench (1)
52. Gun, air dusting (4)
53. Gun, spray enamel nozzle (2)
54. Gun, spray (basecoat/clearcoat) (2)
55. Gun, spray detail (1)
56. Gun, spray (primer) (3)
57. Gun, sandblast (1)
58. Gun, heat (1)
59. Gun, staple (1)
60. Gun, caulking (2)
61. Hacksaw (2)
62. Hammer, machinist (4)
63. Hammer set, body (4)
64. Hammer, slide large (snatch bar) (2)
65. Hammer, slide small (snatch bar) (2)
66. Hammer, sledge (1)
67. Headlight set, aiming (1)
68. Helmet, welding (4)
69. Hoist, chain or pneumatic (2T) (1)
70. Hose, air w/quick couplings (50') (20)
71. Jack, floor w/casters (2T) (4)
72. Jack, mechanical (1)
73. Jack, twin saddle (1)
74. Jack, body and fender (10T) (1)
75. Jack, body and fender w/attachments (4T) (1)
76. Jigsaw, (2)
77. Jitterbug, orbital (4)
78. Knife, cold (1)
79. Knife, equalizer (1)
80. Knife, putty (1½") (2)
81. Knife, putty (3") (2)
82. Knife, putty (2") (2)
83. Knife, windshield (pneumatic) (1)
84. Lift, floor (1)
85. Light, flash (2)

86. Light, extension (3)
87. Machine, masking (2)
88. Mallet, rubber (2)
89. Mallet, plastic (1)
90. Mask, particle (4 boxes)
91. Oiler (1)
92. Pan, drain (2)
93. Picks, assorted (2)
94. Plasma arc cutting equipment (1)
95. Pliers, hog ring (1)
96. Pliers set, assorted (3)
97. Pliers, drip molding (2)
98. Pliers, vise grip (10)
99. Polisher, power (variable speed up to 2,000 rpm) (2)
100. Printer, dot matrix (1)
101. Puller, fuse (1)
102. Punch set, metal assorted (1)
103. Rack, frame w/measuring equipment (1)
104. Rag, tack (20)
105. Recovery system, air conditioning (R12) (1)
106. Recovery system, air conditioning (134) (1)
107. Regulator, air w/extractors (12)
108. Repair kit, windshield (1)
109. Respirator, fresh air supply (4 man system) (1)
110. Rod, tram (1)
111. Sander, dual action (6") (8)
112. Sander/Grinder, automotive disc electric (2)
113. Sander, dual action (8") (2)
114. Sander/Grinder, automotive disc pneumatic (2)
115. Saw set, hole assorted (1)
116. Saw, reciprocating (1)
117. Screwdriver set, Phillips (#1,2,3,4) (4)
118. Screwdriver set, Torx (#5-27) (2)
119. Screwdriver set, clutch (1)
120. Screwdriver set, flat blade (6)
121. Scribe, (scratch awl) (4)
122. Shaker, paint (1)
123. Soldering kit (gun or iron) (1)
124. Spoons, assorted (1)
125. Spreader, plastic (50)
126. Stands, adjustable (20)
127. Strap, fender pull (1)
128. Tap and die set, standard (1)
129. Tap and die set, metric (1)

130. Tape, steel (25') (2)
131. Tester, circuit load (1)
132. Tester, multimeter (VOM) (1)
133. Tester, radiator pressure (1)
134. Tool, door handle clip remover (2)
135. Tool, door handle pin removing (1)
136. Tool, pop rivet, large (2)
137. Tool, pop rivet, small (2)
138. Tool, magnetic pickup (2)
139. Torx driver set (¼" and ⅜" drive #5-55) (2)
140. Tubing set, flaring tool (1)
141. Vise (5") (4)
142. Welder, plastic (hot air) (1)
143. Welder, spot (resistance gun) (1)
144. Welder, GMAW (220V) (150 Amp) (1)
145. Welder set, oxyacetylene w/cutting torch (1)
146. Welder, GMAW (220V) (225 Amp) (1)
147. Wrench set, combination metric (5mm - 21mm) (2)
148. Wrench, pneumatic ratchet (¼" drive) (1)
149. Wrench, pneumatic ratchet (⅜" drive) (1)
150. Wrench, pneumatic impact (⅜" butterfly) (2)
151. Wrench, pneumatic impact (½") (1)
152. Wrench set, box end (3/16" - 1¼") (1)
153. Wrench, pneumatic impact ⅜" standard) (1)
154. Wrench set, socket (¼", ⅜", and ½" drive) (4)
155. Wrench set, Allen (2)
156. Wrench set, combination SAE (3/16" - 1¼") (4)

RECOMMENDED INSTRUCTIONAL AIDS

1. Calculator (1)
2. Cart, AV (for overhead projector) (1)
3. Cart, AV (for TV-VCR) (1)
4. Projector, overhead (1)
5. TV-VCR (1)
6. Video out (Microcomputer to TV monitor) (10)
7. Software for Auto Body Repair Parts Identification and Estimation (1)
8. Software for Computerized Record Systems (1)

APPENDIX A:

RELATED ACADEMIC TOPICS

APPENDIX A

RELATED ACADEMIC TOPICS FOR COMMUNICATIONS

C1 Interpret written material.
C2 Interpret visual materials (maps, charts, graphs, tables, etc.).
C3 Listen, comprehend, and take appropriate actions.
C4 Access, organize, and evaluate information.
C5 Use written and/or oral language skills to work cooperatively to solve problems, make decisions; take actions, and reach agreement.
C6 Communicate ideas and information effectively using various oral and written forms for a variety of audiences and purposes.

EXPANDED TOPICS FOR COMMUNICATIONS

TOPIC C1: Interpret written material.

C1.01 Read and follow complex written directions.
C1.02 Recognize common words and meanings associated with a variety of occupations.
C1.03 Adjust reading strategy to purpose and type of reading.
C1.04 Use sections of books and reference sources to obtain information.
C1.05 Compare information from multiple sources and check validity.
C1.06 Interpret items and abbreviations used in multiple forms.
C1.07 Interpret short notes, memos, and letters.
C1.08 Comprehend technical words and concepts.
C1.09 Use various reading techniques depending on purpose for reading.
C1.10 Find, read, understand, and use information from printed matter or electronic sources.

TOPIC C2: Interpret visual materials (maps, charts, graphs, tables, etc.).

C2.01 Use visuals in written and in oral presentations.
C2.02 Recognize visual cues to meaning (layout, typography, etc.).
C2.03 Interpret and apply information using visual materials.

TOPIC C3: Listen, comprehend, and take appropriate action.

C3.01 Identify and evaluate orally-presented messages according to purpose.
C3.02 Recognize barriers to effective listening.
C3.03 Recognize how voice inflection changes meaning.
C3.04 Identify speaker signals requiring a response and respond accordingly.
C3.05 Listen attentively and take accurate notes.
C3.06 Use telephone to receive information.

C3.07 Analyze and distinguish information from formal and informal oral presentations.

TOPIC C4: Access, organize, and evaluate information.

C4.01 Distinguish fact from opinion.
C4.02 Use various print and non-print sources for specialized information.
C4.03 Interpret and distinguish between literal and figurative meaning.
C4.04 Interpret written or oral communication in relation to context and writer's point of view.
C4.05 Use relevant sources to gather information for written or oral communication.

TOPIC C5: Use written and/or oral language skills to work cooperatively to solve problems, make decisions, take actions, and reach agreement.

C5.01 Select appropriate words for communication needs.
C5.02 Use reading, writing, listening, and speaking skills to solve problems.
C5.03 Compose inquiries and requests.
C5.04 Write persuasive letters and memos.
C5.05 Edit written reports, letters, memos, and short notes for clarity, correct grammar, and effective sentences.
C5.06 Write logical and understandable statements, phrases, or sentences for filling out forms, for correspondence or reports.
C5.07 Write directions or summaries of processes, mechanisms, events, or concepts.
C5.08 Select and use appropriate formats for presenting reports.
C5.09 Convey information to audiences in writing.
C5.10 Compose technical reports and correspondence that meet accepted standards for written communications.

TOPIC C6: Communicate ideas and information using oral and written forms for a variety of audiences and purposes.

C6.01 Give complex oral instructions.
C6.02 Describe a business or industrial process/mechanism.
C6.03 Participate effectively in group discussions and decision making.
C6.04 Produce effective oral messages utilizing different media.
C6.05 Explore ideas orally with partners.
C6.06 Participate in conversations by volunteering information when appropriate and asking relevant questions when appropriate.
C6.07 Restate or paraphrase a conversation to confirm one's own understanding.
C6.08 Gather and provide information utilizing different media.

C6.09 Prepare and deliver persuasive, descriptive, and demonstrative oral presentations.

RELATED ACADEMIC TOPICS FOR MATHEMATICS

M1 Relate number relationships, number systems, and number theory.
M2 Explore patterns and functions.
M3 Explore algebraic concepts and processes.
M4 Explore the concepts of measurement.
M5 Explore the geometry of one-, two-, and three-dimensions.
M6 Explore concepts of statistics and probability in real world situations.
M7 Apply mathematical methods, concepts, and properties to solve a variety of real-world problems.

EXPANDED TOPICS FOR MATHEMATICS

TOPIC M1: Relate number relationships, number systems, and number theory.

M1.01 Understand, represent, and use numbers in a variety of equivalent forms (integer, fraction, decimal, percent, exponential, and scientific notation) in real world and mathematical problem situations.
M1.02 Develop number sense for whole numbers, fractions, decimals, integers, and rational numbers.
M1.03 Understand and apply ratios, proportions, and percents in a wide variety of situations.
M1.04 Investigate relationships among fractions, decimals, and percents.
M1.05 Compute with whole numbers, fractions, decimals, integers, and rational numbers.
M1.06 Develop, analyze, and explain procedures for computation and techniques for estimations.
M1.07 Select and use an appropriate method for computing from among mental arithmetic, paper-and-pencil, calculator, and computer methods.
M1.08 Use computation, estimation, and proportions to solve problems.
M1.09 Use estimation to check the reasonableness of results.

TOPIC M2: Explore patterns and functions.

M2.01 Describe, extend, analyze, and create a wide variety of patterns.
M2.02 Describe and represent relationships with tables, graphs, and rules.
M2.03 Analyze functional relationships to explain how a change in one quantity results in a change in another.
M2.04 Use patterns and functions to represent and solve problems.
M2.05 Explore problems and describe results using graphical, numerical, physical, algebraic, and verbal mathematical models or representations.

M2.06 Use a mathematical idea to further their understanding of other mathematical ideas.
M2.07 Apply mathematical thinking and modeling to solve problems that arise in other disciplines, such as art, music, and business.

TOPIC M3: Explore algebraic concepts and processes.

M3.01 Represent situations and explore the interrelationships of number patterns with tables, graphs, verbal rules, and equations.
M3.02 Analyze tables and graphs to identify properties and relationships and to interpret expressions and equations.
M3.03 Apply algebraic methods to solve a variety of real world and mathematical problems.

TOPIC M4: Explore the concepts of measurement.

M4.01 Estimate, make, and use measurements to describe and compare phenomena.
M4.02 Select appropriate units and tools to measure to the degree of accuracy required in a particular situation.
M4.03 Extend understanding of the concepts of perimeter, area, volume, angle measure, capacity, and weight and mass.
M4.04 Understand and apply reasoning processes, with special attention to spatial reasoning and reasoning with proportions and graphs.

TOPIC M5: Explore the geometry of one-, two-, and three-dimensions.

M5.01 Identify, describe, compare, and classify geometric figures.
M5.02 Visualize and represent geometric figures with special attention to developing spatial sense.
M5.03 Explore transformations of geometric figures.
M5.04 Understand and apply geometric properties and relationships.
M5.05 Classify figures in terms of congruence and similarity and apply these relationships.

TOPIC M6: Explore the concepts of statistics and probability in real world situations.

M6.01 Systematically collect, organize, and describe data.
M6.02 Construct, read, and interpret tables, charts, and graphs.
M6.03 Develop an appreciation for statistical methods as powerful means for decision making.
M6.04 Make predictions that are based on exponential or theoretical probabilities.

M6.05 Develop an appreciation for the pervasive use of probability in the real world.

TOPIC M7: Apply mathematical methods, concepts, and properties to solve a variety of real-world problems.

M7.01 Use computers and/or calculators to process information for all mathematical situations.
M7.02 Use problem-solving approaches to investigate and understand mathematical content.
M7.03 Formulate problems from situations within and outside mathematics.
M7.04 Generalize solutions and strategies to new problem situations.

RELATED ACADEMIC TOPICS FOR SCIENCE

S1 Explain the Anatomy and Physiology of the human body.
S2 Apply the basic biological principles of Plants, Viruses and Monerans, Algae, Protista, and Fungi.
S3 Relate the nine major phyla of the kingdom animalia according to morphology, anatomy, and physiology.
S4 Explore the chemical and physical properties of the earth to include Geology, Meteorology, Oceanography, and the Hydrologic Cycle.
S5 Investigate the properties and reactions of matter to include symbols, formulas and nomenclature, chemical equations, gas laws, chemical bonding, acid-base reactions, equilibrium, oxidation-reduction, nuclear chemistry, and organic chemistry.
S6 Explore the principles and theories related to motion, mechanics, electricity, magnetism, light energy, thermal energy, wave energy, and nuclear physics.
S7 Explore the principles of genetic and molecular Biology to include the relationship between traits and patterns of inheritance, population genetics, the structure and function of DNA, and current applications of DNA technology.
S8 Apply concepts related to the scientific process and method to include safety procedures for classroom and laboratory; use and care of scientific equipment; interrelationships between science, technology and society; and effective communication of scientific results in oral, written, and graphic form.

EXPANDED TOPICS FOR SCIENCE

TOPIC S1: Explain the Anatomy and Physiology of the human body.

S1.01 Recognize common terminology and meanings.
S1.02 Explore the relationship of the cell to more complex systems within the body.

S1.03 Summarize the functional anatomy of all the major body systems.
S1.04 Relate the physiology of the major body systems to its corresponding anatomy.
S1.05 Compare and contrast disease transmission and treatment within each organ system.
S1.06 Explore the usage of medical technology as related to human organs and organ systems.
S1.07 Explain the chemical composition of body tissue.

TOPIC S2: Apply the basic biological principles of Plants, Viruses and Monerans, Algae, Protista, and Fungi.

S2.01 Identify the major types and structures of plants, viruses, monera, algae protista, and fungi.
S2.02 Explain sexual and asexual reproduction.
S2.03 Describe the ecological importance of plants as related to the environment.
S2.04 Analyze the physical chemical and behavioral process of a plant.

TOPIC S3: Relate the nine major phyla of the kingdom animalia according to morphology, anatomy, and physiology.

S3.01 Explain the morphology, anatomy, and physiology of animals.
S3.02 Describe the characteristics, behaviors, and habitats of selected animals.

TOPIC S4: Explore the chemical and physical properties of the earth to include Geology, Meteorology, Oceanography, and the Hydrologic Cycle.

S4.01 Examine minerals and their identification, products of the rock cycle, byproducts of weathering, and the effects of erosion.
S4.02 Relate the Hydrologic Cycle to include groundwater its zones, movement, and composition; surface water systems, deposits, and runoff.
S4.03 Consider the effects of weather and climate on the environment.
S4.04 Examine the composition of seawater; wave, tides, and currents; organisms, environment, and production of food; energy, food and mineral resources of the oceans.

TOPIC S5: Investigate the properties and reactions of matter to include symbols, formulas and nomenclature, chemical equations, gas laws, chemical bonding, acid-base reactions, equilibrium, oxidation-reduction, nuclear chemistry, and organic chemistry.

S5.01 Examine the science of chemistry to include the nature of matter, symbols, formulas and nomenclature, and chemical equations.

S5.02 Identify chemical reactions including precipitation, acids-bases, and reduction-oxidation.
S5.03 Explore the fundamentals of chemical bonding and principles of equilibrium.
S5.04 Relate the behavior of gases.
S5.05 Investigate the structure, reactions, and uses of organic compounds; and investigate nuclear chemistry and radiochemistry.

TOPIC S6: Explore the principles and theories related to motion, mechanics, electricity, magnetism, light energy, thermal energy, wave energy, and nuclear physics.

S6.01 Examine fundamentals of motion of physical bodies and physical dynamics.
S6.02 Explore the concepts and relationships among work, power, and energy.
S6.03 Explore principles, characteristics, and properties of electricity, magnetism, light energy, thermal energy, and wave energy.
S6.04 Identify principles of modern physics related to nuclear physics.

TOPIC S7: Explore the principles of genetic and molecular Biology to include the relationship between traits and patterns of inheritance; population genetics, the structure and function of DNA, and current applications of DNA technology.

S7.01 Examine principles, techniques, and patterns of traits and inheritance in organisms.
S7.02 Apply the concept of population genetics to both microbial and multicellular organism.
S7.03 Identify the structure and function of DNA and the uses of DNA technology in science, industry, and society.

TOPIC S8: Apply concepts related to the scientific process and method to include safety procedures for classroom and laboratory; use and care of scientific equipment; interrelationships between science, technology and society; and effective communication of scientific results in oral, written, and graphic form.

S8.01 Apply the components of scientific processes and methods in classroom and laboratory investigations.
S8.02 Observe and practice safe procedures in the classroom and laboratory.
S8.03 Demonstrate proper use and care for scientific equipment.
S8.04 Investigate science careers, and advances in technology.
S8.05 Communicate results of scientific investigations in oral, written, and graphic form.

APPENDIX B:

WORKPLACE SKILLS

APPENDIX B
WORKPLACE SKILLS FOR THE 21ST CENTURY

WP1 Allocates resources (time, money, materials and facilities, and human resources).

WP2 Acquires, evaluates, organizes and maintains, and interprets/communicates information, including the use of computers.

WP3 Practices interpersonal skills related to careers including team member participation, teaching other people, serving clients/customers, exercising leadership, negotiation, and working with culturally diverse.

WP4 Applies systems concept including basic understanding, monitoring and correction system performance, and designing and improving systems.

WP5 Selects, applies, and maintains/troubleshoots technology.

WP6 Employs thinking skills including creative thinking, decision making, problem solving, reasoning, and knowing how to learn.

APPENDIX C:

STUDENT COMPETENCY PROFILE

STUDENT COMPETENCY PROFILE
FOR COLLISION REPAIR TECHNOLOGY

Student: _____

This record is intended to serve as a method of noting student achievement of the competencies in each course. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the program.

In the blank before each competency, place the date on which the student mastered the competency.

Restraint Systems and Interior Trim (ABT 1113)

_____ 1. Apply procedures for servicing active restraint systems.
_____ 2. Apply procedures for servicing passive restraint systems.
_____ 3. Explain the operation of an air bag restraint system.
_____ 4. Apply procedures to service headliners.
_____ 5. Apply procedures to service carpets.

Bolted Units, Assemblies, and Electrical Systems (ABT 1123)

_____ 1. Remove and replace bolted-on body units.
_____ 2. Remove and replace electrical components.

Glass and Related Hardware Installation and Sealing (ABT 1133)

_____ 1. Identify different types of glass used in automobiles.
_____ 2. Service electric power window motors.
_____ 3. Apply procedures for installation of stationary glass.
_____ 4. Identify the two types of windshield sealers.
_____ 5. Apply procedures to install and adjust movable glass units.
_____ 6. Apply procedures for installation of gasket type glass.
_____ 7. Apply procedures to locate and prevent wind and noise leaks.

Automotive Body Welding and Cutting (ABT 1213)

_____ 1. Apply skills and practices in plasma arc cutting.
_____ 2. Apply skills and practices in Gas Metal Arc Welding (GMAW) of high strength steels used in unibody construction.
_____ 3. Protect computer and electrical components from damage by electrical charges produced by PAC and GMAW processes.

Refinishing I (ABT 1313)

_____ 1. Analyze existing automobile paint type and condition.
_____ 2. Prepare an automobile for refinishing.
_____ 3. Determine automotive paint problems, including causes and solutions.
_____ 4. Determine failure of automotive painting and provide causes and solutions.

Refinishing II (ABT 1324)

_____ 1. Identify the parts, disassemble, and clean a paint gun.
_____ 2. Operate a spray gun.
_____ 3. Demonstrate spray technique.

Sheet Metal Repair (ABT 1414)

_____ 1. Apply methods of repair and use tools to rough out auto body panels.
_____ 2. Perform simple sheet metal repairs.

Body Panel and Upper Structural Repair I (ABT 1423)

_____ 1. Analyze body panel upper structural damage.
_____ 2. Perform body panel upper structural damage repair.

Refinishing III (ABT 2333)

_____ 1. Color sand, buff, and polish.
_____ 2. Prepare vehicle for delivery to customer.
_____ 3. Remove and replace pinstriping, decals, and lettering.

Body Panel and Upper Structural Repair II (ABT 2434)

_____ 1. Plan for repair and replacement of body panel upper structural damage.

Frame and Underbody Structural Repair I (ABT 2513)

_____ 1. Explain functions of components of frame, steering, and suspension.
_____ 2. Explain types of damage to frame.
_____ 3. Explain procedures for frame alignment.
_____ 4. Set up frame alignment equipment.

Frame and Underbody Structural Repair II (ABT 2524)

_____ 1. Restore corrosion protection.
_____ 2. Explain procedures for repair of frame and underbody damage.
_____ 3. Align frame and underbody components.

Fiberglass and Plastic Repair (ABT 2613)

_____ 1. Apply procedures for fiberglass repair.
_____ 2. Apply procedures for repairs on sheet molded compounds.
_____ 3. Perform repairs on plastic automotive panels.

Collision Analysis and Estimation (ABT 2713)

_____ 1. Explain procedures for use of collision and reference manuals.
_____ 2. Explain practices for analyzing damage and estimating repair procedures utilizing manual and computerized systems.

Shop Operations and Procedures (ABT 2813)

_____ 1. Explain procedures for the operation of a collision repair business.
_____ 2. Explain layout of a collision repair shop.

Special Problem in Collision Repair Technology (ABT 291(1-3))

_____ 1. Prepare a written agreement.
_____ 2. Prepare a written report of activities.
_____ 3. Follow written guidelines for special problems.

Work-Based Learning in Collision Repair Technology (ABT 292(1-6))

_____ 1. Apply technical skills needed to be a viable member of the work force.
_____ 2. Apply skills developed in other program area courses.
_____ 3. Apply human relationship skills.
_____ 4. Apply and practice positive work habits and responsibilities.
_____ 5. Work with instructor and employer to develop written occupational objectives to be accomplished.
_____ 6. Assess accomplishment of objectives.
_____ 7. Utilize a set of written guidelines for the work-based learning program.